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Mycenastrum corium and gastrointestinal mycetism in México

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Abstract — Several specimens of *Mycenastrum corium* were collected for the first time at the Botanic Garden of the UNAM Biology Institute in the Pedregal de San Ángel Ecological Reserve (REPSA), México City. Of the five people who ingested the fungus, three showed no signs of gastrointestinal distress while two suffered from severe flatulence and diarrhea six hours after ingestion. The collections are described and distribution of the species in Mexico and elsewhere is noted.

Key words — *Agaricaceae,* chorology, puffball, toxic fungi

Introduction

Mycenastrum corium has been recorded from South America (Homrich & Wright 1973), United States of America (Perreau & Heim 1971; Miller et al. 2005), and Yemen (Kreisel & Al-Fatimi 2004). The fungus is not well known in México, where very few records can be found. In this paper we report an abundant collection of *M. corium* from the core area of Botanic Garden of National Autonomous University of Mexico (UNAM), Biology Institute, in the Pedregal de San Angel Ecological Reserve (REPSA), Mexico City. We describe the species based on Mexican material, and comment on its national distribution.

Material & methods

The identified specimens were collected between May and August in the Botanic Garden, IBUNAM, RESPA (19°17 N 99°11 W), and the species was under constant supervision during the rainy season from June to August 2014. The material studied has been deposited in the Fungi Collection from National Herbarium of Mexico (MEXU) of Biology Institute. Specimen identification was based on Herrera (1964), Guzmán &

Herrera (1969), Homrich & Wright (1973), and Li et al. (2012). Tissue sections were mounted in 10% KOH, cotton blue in lactic acid and/or Melzer's solution. The color codes enclosed in parenthesis are based on Kornerup & Wanscher (1978). Samples of the gleba (MEXU 27540) were fixed in 4% glutaraldehyde. Dehydrated with graduated alcohols, dried in an Emitech K850 Critical Point Dryer, and fixed on aluminum slides covered with gold layer for examination with a Hitachi Electronic Scanning Microscope (model SU1510).

Taxonomy

Mycenastrum corium (Guers.) Desv., Ann. Sci. Nat., Bot., sér. 2, 17: 147 (1842

Plate 1

Young fructifications are white, globose, 5–27 cm in diameter. Pseudostipe 2–7 cm long, consisting of soil-covered mycelium. Peridium 1–2 cm thick, consisting of two layers in the juvenile stage and in the adult stage, 1–2 mm. Exoperidium is adhered to the endoperidium, also white, smooth, in its juvenile phase. When the basidiome matures, the exoperidium ruptures forming large deciduous scales exposing the light-brown endoperidium (4F4), which is tasteless, smooth, and with a coriaceous consistency and a foul dirty-sock odor that increases when dried; when mature the endoperidium opens, leaving a star-shaped opening and exposing a dark-brown gleba (5F5) composed of the basidiospores and capillitium; capillitial filaments thick-walled, branched with numerous short thorn-like points of different diameter. The basidiospores are ornamented, spherical, approximately 8 µm in diameter with and exosporium that in young specimens is thick and relatively smooth and when mature develops a reticulate ornamentation (SEM).

Specimens studied— **MÉXICO**. **Distrito Federal**: **México City**, Tlalpan, private house, growing on grass, 6.VIII.2012, R. Martínez Flores (MEXU 27530 immature specimens; MEXU 27531 mature specimens); UNAM-University City: Botanic Garden, Biology Institute, 9.V.2014, R. Garibay (MEXU 27532); 13.V.2014, A. De la Cruz-Martínez (MEXU 27534); 20.V.2014, E. Pérez-Silva, A.J. Medina-Ortiz & A. De la Cruz-Martínez (MEXU 27533); 2.VII.2014, E. Pérez-Silva & A.J. Medina-Ortiz (MEXU 27540); 25.VII.2014, E. Pérez-Silva & A.J. Medina-Ortiz (MEXU 27561); 13.VIII.2014, E. Pérez-Silva & A.J. Medina-Ortiz (MEXU 27551); 18.IX.2014, E. Pérez-Silva & A.J. Medina-Ortiz (MEXU 27553); 13.X.2014, E. Pérez-Silva & A.J. Medina-Ortiz (MEXU 27554). **Estado de México**: **Municipality of Naucalpan de Juárez**, Satelite City-Economist Circuit, on green area from Santander Bank, 24.VII.2014, E. Pérez-Silva (MEXU 27560 immature specimens).

Discussion

The morphology and anatomy of our specimens as confirmed by SEM examination coincide with the taxonomy description of *M. corium* by Homrich & Wright (1973), and the capillitium and spores match the descriptions by Perreau & Heim (1971) and Li et al. (2012). The species has previously been

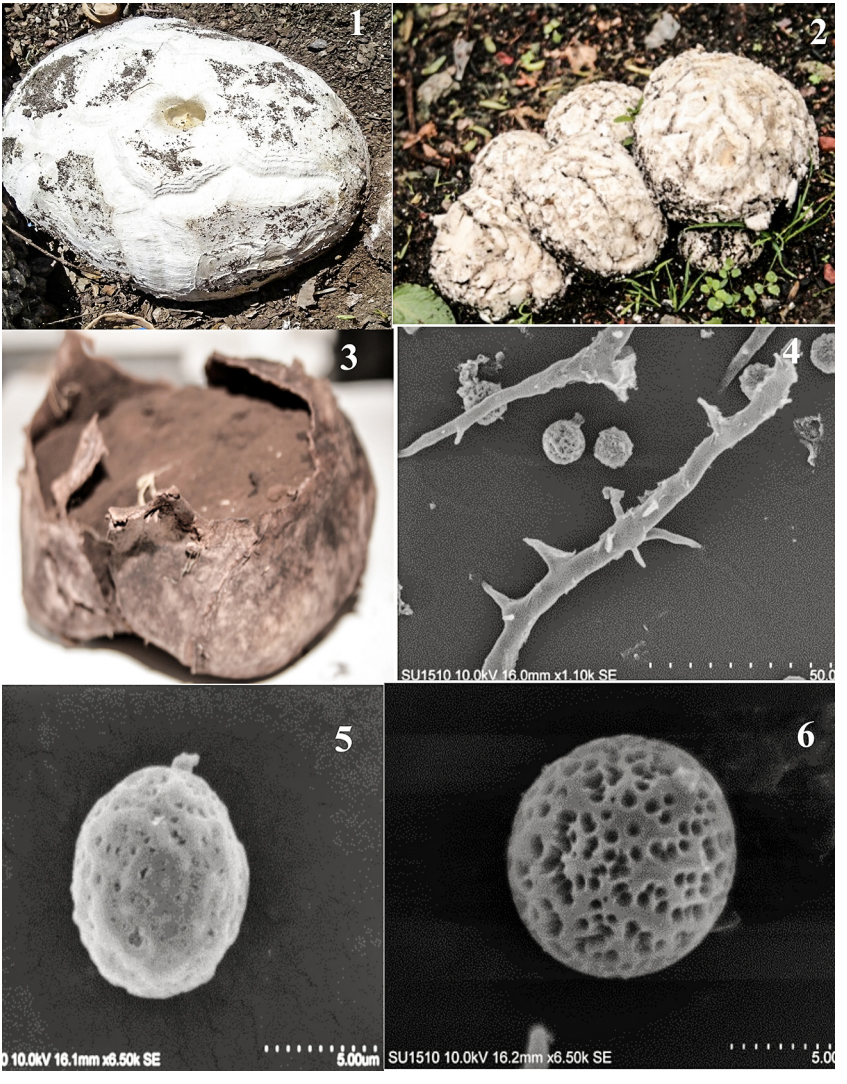

Plate 1. *Mycenastrum corium*. 1. Young single basidiome (MEXU 27532). 2–6 (MEXU 27540): 2. Gregarious basidiomes in different stages of maturity; 3. Mature basidiome, showing cracked endoperidium and gleba); 4. Capillitium branched with spines; 5. Subglobose immature spore; 6. Spherical mature spore.

recorded in Mexico from Chihuahua State (Moreno et al. 2010), Nuevo León and San Luis Potosi States (Guzmán & Herrera 1969), and Sonora State

(Guzmán 1972, Esqueda et al. 2000) growing in grassland, oak, juniper and pine forests; its habit can be solitary or gregarious (with MEXU 27540 forming 1.5 m "fairy circles").

The specimens examined varied in size from 5 to 27 cm in diameter and were greatly admired by many who thought they were edible due to their resemblance to some *Calvatia* species. Thus with no precaution, the fungi were cooked with butter, garlic, salt, goat cheese, and red wine. One person who ate two specimens (approximately 155 g each) had diarrhea 8 hours later; another person who also ate two similar specimens had a stomachache, passed gas throughout the night, and finally had diarrhea. Three others experienced no symptoms.

These symptoms indicate that the two collectors suffered a kind of gastrointestinal mycetism; such symptoms place *M. corium* within the "benign species" (Heim 1963). Benjamin (1995) does not consider or mention any symptoms. Ayala & Ochoa (1998) mention this species as having anti-inflammatory properties, as a tonic for throat and lungs, and as hemostatic. Children use large basidiomes to play ball because the thick exoperidium allows them to sustain strong blows without rupturing. As fructifications enlarge, the exoperidium thins to 2 mm and the endoperidium becomes leathery and difficult to cut.

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